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ABSTRACT

In 2000, the Georgia Legislature mandated that all certified school personnel complete the Georgia Framework for Integrating Technology in the Student-Centered Classroom (InTech), or approved alternatives. InTech is a constructivist-based technology-training program. It was developed as a statewide staff development initiative by the Georgia Department of Education in 1997, and was implemented in 1998. The purpose of this paper is to provide information about this initiative to improve teaching and learning through technology. Included in this paper are: a problem statement, brief summaries of three dissertation research studies investigating the influences of InTech at the elementary, middle and high school level, and recommendations regarding similar initiatives. (Contains 16 references.) (AEF)

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The evidence for InTech: What does research say about Georgia's required technology training?

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In 2000, the Georgia Legislature mandated that all certified school personnel complete the Georgia Framework for INtegrating TECHnology in the Student-Centered Classroom (InTech) or approved alternatives. InTech is a constructivist-based technology-training program. It was developed as a statewide staff development initiative by the Georgia Department of Education in 1997, and was implemented in 1998. The purpose of this paper is to provide information about this initiative to improve teaching and learning through technology. Included are a problem statement, brief summaries of three dissertation research studies investigating the influences of InTech, and recommendations regarding similar initiatives.

Statement of the Problem

Since 1993, the state of Georgia has invested over $337 million in support of its belief that providing educational technology for classrooms offers effective ways to improve schools and to help students learn (Brackett, Henry, & Weathersby, 1999). It has been reported that Georgia schools have 210,885 computers, with 98 percent having Internet access and 49 percent equipped with local area networks (Coley et al, 1997; Georgia Department of Education, 2000). The FY 2001 Georgia education budget included $29,485,875 funding for computers (Sherrod, 2000).

Availability of technology is one issue; its use is another (Byrom, 1998). To prepare teachers to integrate technology, student learning, and academic goals, the Georgia Framework for INtegrating TECHnology in the Student-Centered Classroom (InTech) was designed as staff development training in technology. Its overall goal was to provide a catalyst for fundamental changes in the teaching and learning process. Instruction in this program is constructivist-based and is expected to lead participants to development of constructivist teaching philosophies, characterized by a shift to more student-centered learning (Holmes et al., 1998). InTech activities are designed to promote active, problem-based learning opportunities that can be transferred to participants' classrooms.

Since its introduction in 1998, numerous Georgia school systems voluntarily have implemented InTech and over 15,000 Georgia educators have been trained through the program. In 2000, Governor Roy Barnes signed into law Georgia House Bill 1187 (The A Plus Education Reform Act of 2000) which mandates that all Georgia teachers and administrators seeking certification or certificate renewal must complete successfully the InTech training program or demonstrate competency in ISTE computer skill standards through alternatives approved by Georgia's Professional Standards Commission.

This state-sponsored initiative was enacted to improve Georgia's schools and to enhance student learning; however, decisions for the ongoing commitment were made without empirical support. To address the specific need for research examining the influences of InTech and the general need for research examining the most effective ways to implement changes necessary for integrating technology into the curriculum, three doctoral candidates at Valdosta State University (VSU) conducted dissertation studies of InTech. Variables of the three studies include: perceived levels of technology integration, accessibility to technology, administrative support, teacher integration of technology, student utilization of technology, teacher and administrator beliefs related to technology use. Summaries are given below.

InTech Training, Technology Integration, and Administrative Support of Technology: Perceptions of Elementary School Teachers.
By Lynn Minor

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InTech has been offered to teachers in the Valdosta State University (VSU) service region for the past three years through the VSU Educational Technology Teaching Center (ETTC). However, the extent to which InTech training at the VSU ETTC or through the redelivery programaffects the technology integration of teachers was largely unknown. Redelivery is a term used to refer to a model of implementing InTech training in which teachers receive trainer-of-trainers instruction at the ETTC and return to implement InTech with teachers in their own school. This quantitative research study was conducted to evaluate the effectiveness of Phase One of the Elementary InTech Professional Development Program offered at Valdosta State University. The purpose of the investigation was to exa mine perceived levels of technology integration of elementary school teachers as a function of the InTech training model received and to determine whether a relationship was present between perceived levels of administrative support and technology integration. Accessibility to technology in the classrooms of the participants was also investigated.

Methods

Data for this study were collected using a questionnaire, titled Technology Integration Survey for Teachers, that was adapted from the Student Achievement Survey used by the Bernie School District (1999). Twenty-six questions concerning teachers' perceptions of technology use in their classrooms, accessibility of technology in the classroom, and administrative support for technology integration in their schools were included on the instrument. Participants were selected using purposive sampling to include teachers in the Valdosta State University (VSU) Educational Technology Training Center (ETTC) service area who teach at elementary schools with the following three groups of teachers: teachers who received InTech training at the VSU ETTC, teachers who received InTech training through the redelivery model at their own school, and teachers who have not received InTech training. Twenty-six elementary schools, representing 9 of the 45 school districts in the VSU ETTC service area, met the criteria for this study. Completed surveys were received from 630 of the 993 possible participants, representing a response rate of 63%.

Results

Responses to sixteen Likert-type survey items were combined to calculate the perceived level of technology integration. A one-way analysis of variance (ANOVA) was conducted to determine whether an overall difference in the perceived level of technology integration was present as a function of the InTech training model. Statistically significant differences were found for perceived levels of technology integration with a main effect of $F(2, 610) = 66.28$, $p < .0005$. Teachers who received training at the VSU ETTC ($M = 50.69$) perceived their level of integration as significantly higher than did teachers who received training through the redelivery model ($M = 46.15$) and teachers with no InTech training ($M = 37.41$). Furthermore, a statistically significant difference was also found in the perceived level of technology integration between teachers who received InTech training through the redelivery model and those with no InTech training. Calculation of eta squared yielded an effect size of .47. According to Cohen, (1988), a large effect is represented by these results.

Additional information pertaining to teachers' perceived levels of technology integration was gleaned by analyzing responses to survey items concerning accessibility to various types of technology in their classrooms. Pearson chi-square tests were conducted for each possible response to determine whether statistically significant differences were present among the three groups of teachers. Statistically significant differences in access to a scanner, more than one multimedia computer, and a scan converter and television were found with more VSU ETTC InTech teachers reporting access to these than redelivery and non-InTech teachers. In addition, more redelivery teachers reported access than did non-Intech teachers. However, mo re teachers who received training through the redelivery model and teachers with no InTech training reported having one multimedia computer than did teachers trained at the VSU ETTC. Interestingly, a higher percentage of redelivery InTech teachers reported having access to a digital camera than did VSU ETTC InTech teachers and non-InTech teachers. No statistically significant difference was found among the three training groups for access to a laser disk player.

Teachers' responses to five Likert-type survey items were combined to calculate perceived levels of administrative support. A statistically significant relationship was found between perceived administrative support and levels of technology integration. Use of a Pearson r yielded the following: $r(613) = .23$, $p < .0005$. Squaring the correlation provided evidence that 5.29% of the variance was shared between the perceived levels of administrative support and technology integration. According to Gay and Airasian (2000), this coefficient indicates a weak relationship.

Conclusions

Phase One of Elementary InTech training has had favorable effects on technology integration in the classrooms of elementary teachers who received this training. Teachers who received InTech training through the VSU ETTC indicated higher levels of technology integration than did teachers who received InTech training through the redelivery model and teachers with no InTech training. Furthermore, a statistically significant relationship was found between the perceived levels of administrative support and levels of technology integration. Although this finding represented a weak relationship, administrative support of technology professional development, and integration is recommended. Administrators can provide support for technology integration by arranging for teachers to participate in professional development, making technology accessible in classrooms, and modeling the use of technology.

Teachers' and Administrators' Beliefs Regarding Constructivist-Based, Exemplary Practices for Technology Integration in Middle School Classrooms
By Fritzie Sheumaker

Introducing technology into classrooms as key components in the teaching and learning process involves more than providing hardware and software. The use of technology must coincide with how students learn best (National Council for Accreditation of Teacher Education Task Force on Professional Development [NCATE], 1997). Because the constructivist use of technology engages students in the learning process and helps them build new ideas (Jonassen, Peck, & Wilson, 1999) constructivist philosophy provides the foundation for effective strategies for teaching with technology (Strommen & Lincoln, 1992).

InTech was designed to help both teachers and administrators develop constructivis t-based pedagogies and use technology as part of broader educational change and reform efforts (Holmes et al., 1998). While teachers make technology use work in classrooms (Anderson & Harris, 1997, Becker, 1999, 2000; Saye, 1998), administrators are essential to organizational change in schools (Bennett, 1996, Lambert, 1998, Stanley et al., 1998). The building principal was found to be the change agent responsible for implementing technology integration and to be an important factor in creating momentum toward exemplary technology use, constructivist practice, and improved learning for students.

Because no studies were found on the effectiveness of Georgia's InTech professional development model in promoting comparable teacher and administrator beliefs, the purpose of this study was to assess the effect of participation in InTech training on middle school teachers' and administrators' beliefs regarding constructivist-based, exemplary uses of classroom technology.

Methods

A causal-comparative research design was used, and participants included 342 teachers and 29 administrators from 10 Southwest Georgia Middle Schools. Data were gathered from each participant's responses on the Technology and Teaching Practices Survey (TTPS) and were analyzed through analysis of variance procedures. In a process labeled as qualitative contrasting case analysis (Onwuegbuzie & Teddlie, in press), qualitative data were collected through interviews with two teachers and two administrators identified on the basis of their quantitative survey scores. The selection of the interview participants was based on extreme TTPS scores with high constructivist being those respondents with a mean score greater than 5.0 and low constructivist those whose mean scores were less than 3.0.

Results

A factor analysis of participant responses on the TTPS revealed three factors related to constructivist beliefs: (a) Nature of Classroom Instruction (NCI), (b) Nature of Classroom Roles (NCR), and (c) Nature of Knowledge and Evaluation (NKE). A score was also calculated from two additional items as an indication of participants' Comfort with Using Computers (CCI). Based on the view of Feng (1995) that educators may adhere to constructivist beliefs in varying degrees, cut points for the total TTPS mean were established. An examination of the distribution of scores revealed a normal curve, and the means were then coded into a new variable labeled as Constructivist Category. A mean score between 2.00 – 3.00 indicated a participant could be termed a "Traditionalist." A mean score of 3.01 – 4.99 or 5.00 – 6.00 identified a participant as "Emergent-Constructivist" or "Active-Constructivist", respectively.

A statistically significant relationship was found between respondents' InTech status and constructivist category. With regard to all InTech-trained teachers and administrators, 11% scored at the Active-Constructivist level and 88% as Emergent-Constructivist. When only teacher respondents were considered, there was also a statistically significant relationship between InTech status and Constructivist Category with 89 % of InTech-trained teachers ranked as Emergent-Constructivist and 11% as Active-Constructivist. There was no statistically significant relationship between administrators' InTech status and their Constructivist Category.

Statistically significant differences were found based on the total TTPS mean and the NCI, NCR, and CCI subscale scores between the constructivist-based beliefs of InTech trained teachers and administrators and non-InTech trained teachers and administrators. InTech-trained teachers also had statistically significantly higher scores than their non-InTech-trained counterparts on the total TTPS and the NCI and NCR subscales. However, InTech training did not appear to have the same influence on the constructivist-based beliefs of participating administrators. No statistically significant differences were found in administrators' scores on the TTPS total score, nor the NCI, NCR, or NKE subscales. InTech-trained administrators did have statistically higher scores on the CCI subscale than non-InTech-trained administrators.

Analysis of the interview data from a Traditionalist Teacher, a Traditionalist Administrator, an Active-Constructivist Teacher, and an Active-Constructivist Administrator revealed that a school-wide shared vision for the nature of technology integration appeared to be the most influential factor contributing to teachers' and administrators' views being more or less congruent with constructivist philosophy. Other factors identified as contributing to a respondent's constructivist views were: (a) the degree of emphasis given to standardized testing when curricular and instructional decisions were made; (b) the degree of administrative support for constructivist-based instructional practices; (c) the level of comfort a respondent had with student-centered classroom roles, (d) the level of support for performance-based classroom assessments, and (e) how standardized testing demands were balanced with technology use. Both teachers and administrators viewed InTech as a factor contributing to their comfort with using computers for classroom instruction.

Conclusions

The results of this study are an indication that InTech training is beneficial to middle school teachers and administrators who complete it and may increase the likelihood that participating teachers and administrators will share a vision for effective technology use. Moreover, constructivist-based beliefs are present among teachers and administrators in Southwest Georgia middle schools with the majority of study participants scoring in the Emergent-Constructivist Category. However, concerns about student performance on standardized tests may decrease the support for and use of constructivist-based teaching strategies. Constructivism is not an end to itself; its value lies in its capacity to have a positive influence on student learning (Feng, 1995). To strengthen commitment to constructivist-based, exemplary uses of classroom technology, improving student learning outcomes should be an essential focus of the skills and beliefs promoted by InTech.

The Effectiveness of a Constructivist-Based Professional Development Technology Integration Program in Increasing Technology Utilization
By Rachelle Fowler

With the increasing availability of technology in the school systems, a key issue educators must address is the effective integration of technology into the curriculum. Although many current educators completed their professional training before the technological age in education, they are compelled to use technology that most find unfamiliar and intimidating (Armstrong, Davis, & Young, 1996). To address teachers' needs for technology skills, numerous Georgia school systems have implemented staff development training in technology through InTech, a constructivist-based professional development technology integration program. Although Georgia has taken steps to encourage teacher proficiency in the use of technology, such proficiency may not be enough to affect student use of technology in the classroom. The purpose of this study was to investigate both teacher and student utilization of technology in the academic classrooms of teachers who have or have not been trained in a constructivist-based professional development technology training program such as the state-sanctioned InTech model.

Methods

The research study utilized a mixed methods design. Quantitative data were collected through teacher and student surveys, teacher logs of technology use, and computer lab and media center sign-in sheets. Qualitative data

were collected through teacher/student interviews and classroom observations. Subjects for the study included 65 teachers and 265 students at a comprehensive high school located in rural Southwest Georgia.

Results

Both quantitative and qualitative analysis of data indicated an increase in the use of technology. Teachers in the group who had been trained through the InTech model utilized technology for teacher-related tasks more frequently than they did prior to training. Data analysis revealed an increase in the use of technology for student management of grades, student information, school management, word processing, databases and spreadsheets, desktop publishing, multimedia/authoring, instructional demonstration and tutoring, information retrieval, Internet, web page development, and e-mail. Trained teachers also utilized technology more frequently for teacher-related tasks in some categories than untrained teachers. Data analysis revealed an increase in the use of technology for spreadsheets and databases, instructional demonstrations, word processing, and Internet access.

Congruently, students enrolled in the classes of trained teachers were required to use technology more frequently than they were prior to teacher training. Data analysis revealed an increase in the use of technology for computer-assisted instruction for simulations and educational games, word processing, information retrieval, databases and spreadsheets, Internet access, and electronic presentations. Students enrolled in classes of trained teachers were also required to use technology more than students in the classes of untrained teachers. Data analysis indicated a significant increase in the use of word processing, electronic presentations, and Internet access for students of trained teachers. Teachers from both groups, who required students to use technology, employed constructivist-based principles in their assignments.

Conclusions

Based on the results of analyses of quantitative and qualitative data, InTech, a constructivist-based model of professional development for technology integration training, increases both teacher and student utilization of technology. However, many factors influence the degree to which technology is implemented in a school system. Because of the importance of technology in our highly technological society and global economy, educators should continue to investigate the most effective ways to implement changes necessary for integrating technology into the curriculum.

Recommendations

The recommendation for more research is a given for the conclusion of any review of research literature. The three studies described in this paper, although all investigated InTech, were quite diverse. Three school levels, elementary, middle and high school were represented in the studies. Multiple factors in relation to technology integration training were researched, including delivery models, administrative support and student use of technology. The InTech program, in its past and current implementations, is rich ground for further empirical research, for ongoing and accurate evaluation research, and for action research in the Educational Technology Training Centers and the schools where InTech lives its daily life.

More research is not the only need; there is also a need and a promise for more InTech, or alternatives to the program. As the state supported solution to legislatively mandated technology competencies for educational personnel, there is tremendous pressure to make InTech available to very large numbers of educators in a relatively short period of time. This pressure on individuals and organizations has generated controversial discussions about the suitability of InTech training as the 'magic bullet' that will solve the technology integration 'problem'. Many school systems, regional education agencies and institutions of higher education have designed alternative programs to meet their local needs. But InTech remains the best known, most widespread and well-developed technology training model in the state.

InTech is not a static program; it is currently being extended in content and to serve additional populations. InTech has integrated experiences with assistive technologies into the basic program. A program specifically for media specialists has been developed. Some teacher education programs have used a form of InTech to train their pre-service teachers. Higher education faculty have participated in InTech in partnerships with pre-service or in-service teachers. A program based on the model for higher education faculty is in the planning stages. A second, more advanced, level of InTech is in a pilot phase and may answer criticism that the basic InTech doesn't go far enough toward true integration of technology into teaching, learning and the curriculum.

Whether technology integration training is called InTech or not, there is a need for more of it. But such training must be based on real needs of real people. The support and incentives for participation and implementation into the curriculum must be in place. Research can provide data upon which to base these programs, and can provide rationales for continuation or expansion. Support and incentives must be provided at the state and local levels in order for individuals to really buy into the potential of technology to improve teaching and learning.

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